Parkia biglobosa (Jacq.) G. Don.

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Parkia biglobosa (Jacq.) G. Don.

Taxonomy and nomenclature

Family: Leguminoseae

Synonyms: *Mimosa biglobosa* Jacq., *Parkia africana* R. Br., *P. intermedia* Oliver, *P. oliveri* J.F. Macbr., *P. clappertoniana* Keay.

Vernacular/common names: African locust bean and monkey cutlass tree (English).

Local names: bu dubu, houlle (Wolof), enokay (Diola), dawadawa (Hausa), nere (Bambara), duaga or ruaga (Mooré).

Related species of interest: It is sometimes mistaken for *Albizia chevalieri*, which has smaller leaves and whose pods are different, pale brown.

Distribution and habitat

Parkia biglobosa is native to Africa and is an important multipurpose tree of West African savannah land, and one of the most common species of the parkland agroforestry system. Its natural range extends through the sub-Saharan, semi-arid zone from Senegal in the west through Cameroon and Sudan in the east. It is cultivated in tropical America and western India. It is adapted to a wide ecological range and usually to deep loamy and sandy soils. Locally abundant, it is found within an altitude range of 0-600 m, a mean annual rainfall range of 500-1400 mm and at a mean annual temperature of 26°C. It is prominent in strongly seasonal climates where the dry season lasts 4 to 8 months. It regenerates well in nature but the wildings are often damaged by bush fires.

Uses

The timber is white with a brown core, and is relatively hard, but rapidly spoiled by insects and fungi. The timber is used for fuel wood, as well as for tool handles. The tree products are also used for dye, soap and fish poison. The roots, bark, leaves, stems, flowers, fruits and seeds are all used medicinally to treat a range of ailments including diarrhoea, ulcers, pneumonia, burns, coughs and jaundice. The seeds are fermented and used in cooking, commonly used in soups and stews. They contain 30% protein, as well as vitamins and minerals, and are widely used as thickening flour. The sweet yellow pulp contains 60% sugar when ripe and ready to eat and the seeds are particularly valued for their high protein content. The fruit pods are used to produce an insecticide powder, which is added to water and sprayed on crops. The species is increasingly commercialised and even planted privately.

Tree of *P. biglobosa* bearing abundant green pods Photo: M. Sacande.

Botanical description

The tree is about 10-15 m in height, sometimes reaching 20 m. It has a rounded or umbrella shaped spreading crown, with drooping leaves and is without spines. The thick bark is grey with a scaly texture, and has an orange coloured slash. The dark green leaves are alternate, bi-pinnate and 20-40 cm in length, with 8-30 pairs of alternate pinnae, and 14-65 pairs of leaflets per pinnae. The inflorescence is a pendant raceme of glomerules, set at the end of a branch, up to 30-50 cm long peduncle, in pink, orange or red balls. They are 4-5 cm in diameter, and composed of ca. 1500-2000 flowers. The tree is thought to be able to grow as old as 250 years.

Fruit and seed description

Fruit: The fruit is a slightly curved indehiscent pod of 30-40 cm long and 2-3 cm wide. They are leathery, hang in clusters by the club-shaped fruit base, and are dry and brown in colour when ripe. Each pod contains up to 20 seeds, which are embedded in a sweet, yellow, floury pulp.

Seed: The seeds are brown-blackish. Each seed has a 0.5-1 cm long funicle, it is globular-ovoid and slightly compressed laterally. The testa is hard, smooth and glossy. Seed size varies within the pod, with those at

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the centre being largest. The mean thousand seed dry weight is ca. 493 g. Seeds contain ca. 16% oil.

Parkia biglobosa clean seeds (Photo: H. Vautier).

Flowering and fruiting habit

Flowering occurs during the second half of the dry season, usually before the leaves flush. This is usually from December to May in West Africa, but beginning later with increasing latitude. Pollinated preliminary by bats but also by various insects including honeybees. The fruits ripen over the rainy season, approximately 3 months after flowering. Fruit production starts after 8 to 15 years of plant growth, and will reach its maximum production after ca. 30 years. Each tree can produce up to 100 kg of fruits per year. On average, 5 kg of fruits are required to obtain 1 kg of seeds.

Harvest

The fruit is ready for harvesting from late March to August, with some variation between regions. In Burkina Faso the optimum harvest time is from March to May. The whole fruit stand is cut down from the tree by the use of long handled tools.

Processing and handling

Seed extraction requires 8 subsequent procedures: shelling (after-ripening), pre-drying, pounding, sieving, washing in water, sorting through floatation, drying, and visual sorting by hand. It is important that all of the pulp is removed from the seed before they are sown, as they germinate better when clean.

Storage and viability

Seeds exhibit orthodox storage behaviour. Seeds stored with ca. 10% moisture content in a cool room (4°C) at CNSF for 20 years germinated 20% at 20-25°C. Seeds have also been stored at -20°C in RBG Kew seed bank since 1998, maintaining 100% germinability.

Dormancy and pretreatment

Without a pretreatment, only a small percentage (c. 20%) of the seed germinates, due to the dormancy imposed by the hard, thick testa. To improve germination the seed can be scarified using a scalpel, knife, file or hot wire. Alternatively, the seeds can be soaked in sulphuric acid (H_2SO_4) for 10 minutes.

Sowing and germination

Seeds that have been pretreated germinate rapidly and uniformly in 3-4 days, while untreated seeds take many weeks to germinate. The optimum germination temperature range is 25-30ºC, where 100% germination occurs within four days, seeds however, do not germinate at 10ºC. The seedlings need to be protected from livestock, until they are fully established.

Selected readings

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